

**SUBSTITUTE SPECIFICATION**

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Method and Design for Data Output/File Output in Communication Networks, As Well As a Relevant Computer Program Product and a Relevant Computer Readable Storage Medium

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**Description**

The invention relates to a method for direct or indirect data output/file output in communication networks, as well as a relevant computer program product and a relevant computer readable storage medium, which are in particular applicable for displaying and/or printing content from the internet, and intranet, or other storage medium via an end device.

In the past, the internet was accessed mainly via stationary end devices, i.e. personal computers and similar, so that the presentation of content, such as documents, image files, etc., which had been downloaded from the internet, had no device-related limits because these end devices have sufficiently large screens, complex operating systems that can execute a multitude of applications, high memory capacity that enables storage of many applications and processing of files of any size.

Meantime within the context of technical development, the internet is increasingly accessed via mobile end devices such as mobile telephones, handheld computers, laptops, and pocket PCs. These mobile end devices – in contrast to stationary devices – have very small screens, minimal operating systems (WindowsCE, Palm, EPOC/Symbian, etc.), minimal versions of applications adapted for minimal operating systems, low working memory that only allows the processing of small files, and low memory capacity that only allows provision of a selection of applications.

Thus not all files or file formats and/or contents can be issued intelligently or issued at all. This concerns visual output on the display as well as printing the content. For this reason, besides the internet standard HTML, the WAP standard with its WML language

was developed. Based on this WAP standard, a limited form of internet access via mobile devices is possible. However, HTML and WML can only communicate documents that have been created in these languages to the mobile end device.

As solution to this problem it has been suggested, among other things, to convert the relevant files to minimal format to bring them to display on the mobile end device. This conversion is nevertheless conducted manually and offline so that its use is extremely limited.

However, even stationary devices are not always capable of displaying relevant content in an appropriate way, if the necessary application is not installed on them for interpreting the data, insufficient working memory is available for loading the data, or an operating system is available on which the application cannot be executed, for example a Windows application on Unix.

The technology of mobile communication has asserted itself with the standard GSM and will continue to develop with the standards GPRS and HSCSD as well as the future UMTS. Thus the transmission options are continually optimized; i.e., the transmittable data amount increases drastically, whereas the options for issuing the content remain limited.

In the same way, the display of content from the internet, an intranet, or other storage medium which can be accessed from said type of end device is limited.

It is thus the object of the invention to provide a method and a design for data output/file output in communication networks, as well as a relevant computer program product and a relevant computer readable storage medium, which eliminate the above disadvantages and in particular allow content output that is independent of formats and applications.

This object is resolved according to the invention with the features in Claim 1 and Claims 14 to 16. Practical embodiments of the invention are included in the sub-claims.

In the following, the invention is described in more detail in conjunction with the accompanying drawings, wherein:

Figure 1 depicts a first embodiment of the invention, where content intended for output is embedded in a hypertext page;

Figure 2 depicts a second embodiment of the invention, where content intended for output is provided as print file to the end device or stored as print file on a location in the network; and

Figure 3 depicts a third embodiment of the invention, where content intended for output is converted in a pre-defined format.

It is for this purpose presumed that an end device 100 transmits to a data processing unit 102 at least the information 104 necessary for accessing data/files 106 intended for output; that the data processing unit 102, controlled by a computer program 108, opens the data/files 106 intended for output at their respective storage location 110, starts a print job for issuing the data/files 106, and embeds the print file 111 resulting from the print job in a hypertext page 112, particularly a HTML or WML site, and/or converts the data/files 106 intended for output into a pre-specifiable format 113, and transmits 115 the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 to the end device 100 and the end device 100 issues the transmitted data/files 111, 112, 113; or provides the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 for recall on a location 118 in the communication network 114 and transmits to the end device 100 the information 116 necessary for accessing 120 the provided information and the end device 100, after transmission of the information 116 necessary for access, automatically recalls 122 and issues the data/files 111, 112, 113 from the location 118 in the communication network 114 or the data/files 111, 112, 113 intended for output are requested by manual recall and issued.

A design for data output/file output in communication networks 114 is advantageously so constructed that it includes at least one processor and/or chip that is (are) so constructed that a method for data output/file output in communication networks 114 is executable, that an end device 100 transmits to the data processing unit 102 at least the information 104 necessary for accessing data/files 106 intended for output, that the data

processing unit 102, controlled by a computer program 108, opens the data/files 106 intended for output at their respective storage location 110, starts a print job for issuing the data/files 106, and embeds the print file 111 resulting from the print job in a hypertext page 112, particularly a HTML or WML site, and/or converts the data/files 106 intended for output into a pre-specifiable format 113, and transmits 115 the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 to the end device 100 and the end device 100 issues the transmitted data/files 111, 112, 113; or provides the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 for recall on a location 118 in the communication network 114 and transmits to the end device 100 the information 116 necessary for accessing the provided information and the end device 100, after transmission of the information 116 necessary for access 120, automatically recalls 122 and issues the data/files 111, 112, 113 from the location 118 in the communication network 114 or the data/files 111, 112, 113 intended for output are requested by manual recall and issued.

A computer program product for data output/file output in communication networks 114 comprises a computer readable storage medium on which a program is stored that, once it has been loaded onto a computer's memory, enables the computer to perform a method for data output/file output in communication networks 114, by which an end device 100 transmits to a data processing unit 102 at least the information 104 necessary for accessing the data/files 106 intended for output; the data processing unit 102, controlled by a computer program 108, opens the data/files 106 intended for output at their respective storage location 110, starts a print job for issuing the data/files 106, and embeds the print file 111 resulting from the print job in a hypertext page 112, particularly a HTML or WML site, and/or converts the data/files 106 intended for output into a pre-specifiable format 113, and transmits 115 the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 to the end device 100 and the end device 100 issues the transmitted data/files 111, 112, 113; or provides the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 for recall on a location 118 in the communication network 114 and transmits to the end device 100 the information 116 necessary for accessing 120 the provided information and the end device 100, after

transmission of the information 116 necessary for access 120, automatically recalls 122 and issues the data/files 111, 112, 113 from the location 118 in the communication network or the data/files 111, 112, 113 intended for output are requested by manual recall and issued.

To perform data output/file output, advantageously a computer readable storage medium is used, on which a program is saved that, once it has been loaded onto a computer's memory, enables the computer to perform a method for data output/file output in communication networks 114, by which an end device 100 transmits to a data processing unit at least the information 104 necessary for accessing the data/files 106 intended for output; the data processing unit 102, controlled by a computer program 108, opens the data/files 106 intended for output at their respective storage location 110, starts a print job for issuing the data/files 106, and embeds the print file 111 resulting from the print job in a hypertext page 112, particularly a HTML or WML site, and/or converts the data/files 106 intended for output into a pre-specifiable format 113, and transmits 115 the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 to the end device 100 and the end device 100 issues the transmitted data/files 111, 112, 113; or provides the hypertext page 112 containing the print file 111 and/or the print file 111 resulting from the print job and/or the, converted where necessary, data/files 113 for recall on a location 118 in the communication network 114 and transmits to the end device 100 the information 116 necessary for accessing the provided information and the end device 100, after transmission of the information 116 necessary for access 120, automatically recalls 122 and issues the data/files 111, 112, 113 from the location 118 in the communication network 114 or the data/files 111, 112, 113 intended for output are requested by manual recall and issued.

In the following, content 106 is understood as files and data that can be visualized and issued by using application programs. This content 106 can be found in communication networks 114 like internet, intranet – i.e., the network environment of a company –, or other storage medium 110 – like central servers or standalone office computers. Data transmission can thereby be conducted over communication lines, over radio link or infrared transmission as well as a combination of these transmission options.

The address of the content 106 is as a rule a so-called URL (Unified Resource Locator; e.g.,

<http://www.thinprint.com/inhalt.doc>, also called a link), a path name (C:\Dokumente\inhalt.doc) or an unambiguous description (information about a customer with the customer number 1234). All of these forms of address 104 can also be offered to the user of the end device 100 in prepared form.

The end device 100 is preferably a mobile end device such as mobile telephone, handheld computer, laptop, and pocket PC or similar. It hereby also concerns stationary end devices 100 like computers that, as previously described, are not always suitable for displaying every content, whereby in the latter case, the cause lies in the multitude of diverse applications used, which as a rule are not all available on a computer.

The data processing unit 102 is as a rule a high-performance stationary computer or similar. It is, however, also conceivable that mobile end devices are used, insofar as these are appropriately equipped.

The interface can be a conventional cable interface, infrared or Bluetooth interface, or similar.

The address 104 of the content 106 intended for display is preferably sent to the data processing unit 102 via a dialup connection or the internet, whereby the data processing unit 102 could be a computer that is in the user's home or office, a corporate server, or the server of an internet service provider who wants to offer this service.

If the end device 100 or mobile end device 100 is not itself capable of displaying the content 106 onscreen or issuing it, the method provides that all descriptions 104 necessary for loading the desired contents 106 onto a data processing unit 102 are sent from the end device 100 to the data processing unit 102. As a rule it is sufficient to send the relevant URL or the exact storage location. From the data processing unit 102, the content 106 is subsequently loaded and then a print process and/or print job is started or, if necessary, the content 106 is converted to a specific format 113. This format can be globally pre-specified, approximately set fixedly with the computer program implemented according to the invention on the data processing unit 102 so that the conversion is performed independently from the requesting end device 100. It has been

proved practical, for example, to embed the print files 111 and/or the converted content 113 in a HTML or WML site 112. An alternative to this that has also been proven practical is to convert the content 106 into HTML files (or comparable formats), whereby the print view of the content is transmitted as unchanged as possible by the conversion. Thus created HTML files are then stored on a location 118 in the communication network 114 or in the internet by the computer program implemented on the data processing unit 102 and the relevant address 116 (URL) is sent to the requesting end device 100.

Transmission of the necessary descriptions and/or addresses 104 can also be performed in a different manner:

For example, within an internet session – regardless of whether HTML or WAP based – the user can be presented with possible content 106 whose description 104 is transmitted by selection, or the user enters the description 104 directly in a field intended for that purpose. These descriptions 104 are then also forwarded from the web server. The result, i.e. the document view, embedded in a HTML or WAP page 112, is displayed as direct response page to this action and therefore need not be called up again. To the user it seems as if he had simply clicked a link.

A further form of execution provides that transmission of the content is realized as follows: The user sends a mail, whose attachment 106 he cannot open due to the reasons described, to the data processing unit 102, from which he then receives a response mail that contains the link 116 to the result instead of the original document.

In another embodiment, transmission of the relevant address 116 (URL) can also be performed as SMS, whereby the user subsequently accesses 122 the entered network address manually, or the data 116 transmitted by the data processing unit 102 starts a program installed on the end device that automatically accesses 122 the entered network address and issues, saves, and/or prints the content on a print device 124 locally connected to the end device 100.

The use of HTML formats and storage in the internet has the advantage that most end devices 100, including mobile telephones, handheld computers, laptops, and pocket PCs, can access the internet without additional, specific software.

In addition, however, in an alternative form of execution of the invention, a desired output format can also be pre-specified from the end device 100, in which the content 106 is to be converted by the computer program 108 on the data processing unit 102. The associated descriptions can thereby either be transmitted from the end device 100 to the data processing unit 102 together with the access descriptions 104 for the requested content 106 or these format descriptions are stored together with other user descriptions on the data processing unit 102.

Of course the method according to the invention can be combined with other output systems. Thus parallel to storing the content 111, 112, 113 on a location 118 in the communication net 114 – or as alternative to it – a bitmap file 113 can be created and sent to the first end device 100, because as a rule bitmap files can be issued from every end device with graphic display capability.

To keep the data amount to be transmitted from the data processing unit 102 to the end device 100 as small as possible, the (mobile) end device 100 can also send its display information, e.g. display size, necessary scaling, color or black-and-white display, to the data processing unit 102 along with the descriptions 104 for loading the content 106. The data processing unit 102 then creates from the requested content 106 a bitmap file 113 which suffice for the specific requirements so that only the truly necessary data amount is transmitted.

In some cases it could also prove to be intelligent not to create a HTML or WML file from the requested contents 106, but rather pure text files 113 (for example, an ASCII file) that are then sent to the end device 100, because these can be displayed by most end devices.

The invention is not limited to the examples of execution described here. It is much more possible to realize further variants of execution by combining and modifying the described methods and features without leaving the context of the invention.